AMENDMENTS TO THE CLAIMS

Please amend the claims as follows. This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS

1. (Currently amended) A method ~~to obtain M final symbol decisions for signals received through N receive antennas that were transmitted in M parallel data layers, using a same spreading code from M transmit antennas~~, comprising:

space-time equalizing ~~the~~ N received signals to generate M output signals from which at least inter-symbol interference is substantially removed and inter-layer interference is suppressed;

despreading each of the M output signals for generating M soft symbol estimates; and

processing the M soft symbol estimates to derive M final symbol decisions that are made in consideration of modeled residual inter-layer interference present in the space-time equalized M output signals.

2. (Original) A method as in claim 1, where processing includes operating a signal-plus-residual interference (SPRI) detector that operates in accordance with a maximum likelihood (ML) technique.

3. (Original) A method as in claim 1, where space-time equalizing employs a linear minimum mean-square error (LMMSE) criterion.

4. (Original) A method as in claim 1, where transmitting occurs at a base station having the M transmit antennas, where receiving occurs at a mobile station having the N receive antennas, and where N<M.

5. (Currently amended) A system to obtain M final symbol decisions for signals received through N receive antennas that were transmitted in M parallel data layers, using a same spreading code from M transmit antennas, comprising:

a space-time equalizer ~~for operating~~ configured to operate on the N received signals to generate M output signals from which at least inter-symbol interference is substantially removed and interlayer interference is suppressed;

a plurality of despreaders ~~for despreading~~ configured to despread each of the M output signals ~~for generating~~ to generate M soft symbol estimates; and

~~means for processing~~ processing apparatus configured to process the M soft symbol estimates to derive M final symbol decisions that are made in consideration of modeled residual inter-layer interference present in the M output signals of said space-time equalizer.

6. (Currently amended) A system as in claim 5, where said ~~processing means~~ processing apparatus comprises a signal-plus-residual-interference (SPRI) detector that operates in accordance with a maximum likelihood (ML) technique.

7. (Original) A system as in claim 5, where said space-time equalizer employs a linear minimum mean-square error (LMMSE) criterion.

8. (Original) A system as in claim 5, where the M transmit antennas are associated with a base station, where the N receive antennas are associated with a mobile station, and where N<M.

9. (Currently amended) A Multiple Input, Multiple Output (MIMO) RF receiver, ~~comprising N receive antennas for receiving~~ configured to receive M symbols transmitted in M parallel data layers through N receive antennas, using a same spreading code, *c(k)*, from M transmit antennas; a space-time equalizer having N inputs coupled to said N receive antennas and M outputs coupled to individual ones of M code correlators; a signal model generator having an input coupled to a channel estimator and an output for outputting at least a model of residual inter-layer interference; and a signal-plus-residual-interference (SPRI) detector having M inputs coupled to outputs of said M code correlators ~~for receiving~~ configured to receive M soft symbol estimates there from, a further input coupled to said output of said signal model generator, and M outputs ~~for outputting~~ configured to output M final symbol decisions that are made taking into

account the residual inter-layer interference that was not removed by said space-time equalizer.

10. (Original) A MIMO RF receiver as in claim 9, where said signal model generator computes:

$$A_{jm} = \mathbf{w}_m^H \begin{pmatrix} \mathbf{h}_{j1} \\ \mathbf{h}_{j2} \\ \vdots \\ \mathbf{h}_{jM} \end{pmatrix}, j = 1,2,\ldots,M,$$

where A_{jm} is the residual amplitude of the symbol from transmit antenna j when a symbol from transmit antenna m is detected by said space-time equalizer.

11. (Original) A MIMO RF receiver as in claim 10, where said SPRI detector uses a maximum-likelihood (ML) criterion to obtain the final symbol decisions as:

$$\begin{pmatrix} \bar{s}_1 \\ \bar{s}_2 \\ \vdots \\ \bar{s}_M \end{pmatrix} = \arg \min_{u_1,u_2,\ldots u_M} \left\{ \sum_{m=1}^{M} \left| \hat{s}_m - \begin{pmatrix} A_{1m} & A_{2m} & \cdots & A_{Mm} \end{pmatrix} \begin{pmatrix} u_1 \\ u_2 \\ \vdots \\ u_M \end{pmatrix} \right|^2 \right\},$$

where detection of an mth data layer is based on the outputs of all of said M code correlators.

12. (Original) A MIMO RF receiver as in claim 9, where said signal model generator generates signal models for both desired signals and for interfering signals appearing at said M outputs of said space-time equalizer.

13. (Original) A MIMO RF receiver as in claim 9, where said space-time equalizer operates with a linear minimum mean-square error (LMMSE) criterion.

14. (Original) A MIMO RF receiver as in claim 9, where N<M.

15. (Currently amended) A received signal-plus-residual-interference (SPRI) detector comprising M inputs ~~for coupling~~ configured to be coupled to M sources of soft symbol estimates, a further input ~~for coupling~~ configured to be coupled to an output of a signal model generator that models residual inter-layer interference present in an equalized received signal, and M outputs ~~for outputting~~ configured to output M final symbol decisions that are made taking into account the residual inter-layer interference.

16. (Original) The SPRI detector as in claim 15, where the signal model generator computes:

$$A_{jm} = \mathbf{w}_m^H \begin{pmatrix} \mathbf{h}_{j1} \\ \mathbf{h}_{j2} \\ \vdots \\ \mathbf{h}_{jM} \end{pmatrix} \quad , j = 1,2,\ldots,M,$$

where A_{jm} is the residual amplitude of a symbol from transmit antenna j when a symbol from transmit antenna m is detected by a space-time equalizer that generates the equalized received signal, and where said SPRI detector uses a maximum-likelihood (ML) criterion to obtain the final symbol decisions as:

$$\begin{pmatrix} \bar{s}_1 \\ \bar{s}_2 \\ \vdots \\ \bar{s}_M \end{pmatrix} = \arg \min_{u_1, u_2, \ldots, u_M} \left\{ \sum_{m=1}^{M} \left| \hat{s}_m - \begin{pmatrix} A_{1m} & A_{2m} & \cdots & A_{Mm} \end{pmatrix} \begin{pmatrix} u_1 \\ u_2 \\ \vdots \\ u_M \end{pmatrix} \right|^2 \right\},$$

where detection of an *m*th data layer is based on all said M sources of soft symbol estimates.

17. (Original) The SPRI detector as in claim 15, where the received signal is received through N receive antennas from M transmit antennas, where $N \le M$.

18. (Currently amended) A system to obtain M final symbol decisions for signals received through N receive antennas that were transmitted in M parallel data layers, using a same spreading code from M transmit antennas, comprising:

an equalizer ~~for operating~~ <u>configured to operate</u> on the N received signals to generate M output signals from which at least inter-symbol interference is substantially removed and inter-layer interference is suppressed;

a plurality of despreaders ~~for despreading~~ <u>arranged to despread</u> each of the M output signals for generating M soft symbol estimates; and

~~means for~~ processing <u>apparatus configured to process</u> the M soft symbol estimates to derive M final symbol decisions that are made in consideration of modeled residual inter-layer interference present in the M output signals of said equalizer.

19. (Currently amended) A system as in claim 18, where said processing ~~means~~ apparatus comprises a signal-plus-residual-interference (SPRI) detector.

20. (Original) A system as in claim 19, where said SPRI detector operates in accordance with a maximum likelihood (ML) technique.

21. (Original) A system as in claim 19, where said SPRI detector operates in accordance with a Maximum a posteriori (MAP) technique.

22. (Original) A system as in claim 19, where said system forms a part of an ordered successive interference canceller (OSIC) receiver.